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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/679,023	10/04/2000	Xiao-Bo Wang	471842000200	5573

25225 7590 04/08/2003

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EXAMINER

BROWN, JENNINE M

ART UNIT	PAPER NUMBER
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1755

DATE MAILED: 04/08/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application N .	Applicant(s)	
	09/679,023	WANG ET AL.	
	Examin r	Art Unit	
	Jennine M. Brown	1755	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 25-41, 44-48 and 65-78 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-41, 44-48 and 65-78 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____.  |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>10</u> . | 6) <input type="checkbox"/> Other:  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

Examiner has entered Applicants amendment, which obviates Examiners rejection, therefore the rejection has been withdrawn.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 25-41, 44-48, 65-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda, et al. (US 6216538) in view of Becker, et al. (US 6294063).

Yasuda, et al. teach an electrophoretic and acoustic force apparatus for field flow fractionation with carrier medium (col. 3, l. 19-35; col. 7, l. 15-20; col. 9, l. 58-63; col. 12, l. 63). At least two electrode and at least two piezoelectric transducers are taught (acoustic - col. 5, l. 62 – col. 6, l. 2; col. 6, l. 43-49; col. 7, l. 26-29, 44-48; col. 11, l.

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11-17; col. 15, l. 45-49; electric – col. 10, l. 33-34, 38-45; col. 11, l. 18-24; col. 12, l. 1-3; col. 15, l. 43-44). Phase of the wave can be varied as well as the amplitude which can create an inhomogeneous acoustic field (col. 6, l. 30-42). Yasuda, et al. teach that the acoustic wave generating elements can be switched back and forth to be either wave sending or wave receiving and each element can be individually controlled (col. 7, l. 57 – col. 8, l. 5; col. 8, l. 33-36). Example 1 teaches a method of sequential and or simultaneous use of both electrophoretic and acoustic fields. Yasuda, et al. do not specifically teach inlet and outlet ports or an array of electrodes.

Becker, et al. teach multiple inlet and outlet ports in an electrophoretic field flow fractionation apparatus as well as an array of electrodes (col. 4, l. 46 – col. 5, l. 3) for manipulation of sample (Figures 9, 9B, 11, 12, 13). Becker, et al. teach a chamber with at least one inlet port and at least one outlet port (col. 3, l. 26-28) with at least two electrode elements and preferably an electrode array disposed along a portion of the chamber energized by an electrical signal generator to create an electrical field to cause an electrophoretic force normal to the traveling direction of a carrier medium (col. 3, l. 49 – col. 4, l. 10, 35-40) whereby the chamber may be a tube (col. 28, l. 1-2). The AC or DC signal generator can be connected to a plurality of electrical conductor buses connected to more than two individual electrode elements (col. 7, l. 16-36; col. 20, l. 34-56). Alternately, electrode elements can be adapted longitudinally or latitudinally along the inside or outside of the chamber whereby the array may be parallel, interdigitated, castellated, polynomial or plane (col. 4, l. 1-40, 47-50). Electrode

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elements are made of metal layer(s) on the surface of the chamber, particularly gold and chromium (col. 7, l. 16-21; col. 20, l. 56-62). These elements create a spatially inhomogeneous electric field (col. 5, l. 9-20) to vary the magnitude and frequency of the electrical signals (col. 4, l. 64 – col. 5, l. 8). Becker teaches introducing a medium into the apparatus (Example I, col. 16, l. 16 – col. 17, l. 51) and into the chamber giving a velocity profile and applying at least one electrical signal to provide an electrophoretic force on the medium normal to the traveling direction of the carrier medium and a second electrical signal used to generate an acoustic wave to displace matter normal to the direction of the carrier medium.

It would have been obvious to one of ordinary skill in the art to provide inlet and outlet ports so that the flow can go into one part of the device and out another part of the device as well as provide an array of electrodes so that electrical and acoustic fields may be generated and/or controlled simultaneously because Yasuda teaches both electrical fields for electrophoretic purposes as well as acoustic fields to focus separations in a capillary or flat surface and it would be easier to control both acoustic and electrical fields both individually and simultaneously so that sample position, separation and spatial relation and detection can be done easily and automated by computer.

### ***Response to Arguments***

Applicant's arguments with respect to claims 25-41, 44-48, 65-78 have been considered but are moot in view of the new grounds of rejection.

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Yasuda, et al. teaches both electrophoretic movement of a sample as well as acoustic movement of a sample using transducers and electrodes. Becker, et al. cures the defects of Yasuda, et al. by providing multiple inlet and outlet ports as well as electrode arrays. Both are used to manipulate packets of particles using an array for movement and detection, both have computer control of the systems and both have individual control of each transducer and electrode for manipulation of individual packets and would be considered analogous art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennine M. Brown whose telephone number is (703) 305-0435. The examiner can normally be reached on M-F 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Bell can be reached on (703) 308-3823. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 879-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

jmb  
April 1, 2003

  
Mark L. Bell  
Supervisory Patent Examiner  
Technology Center 1700